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# **Managing Nuclear Safety Knowledge: *National Approaches and Experience***

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# OUTLINE

## DRAFT REPORT

### Managing Nuclear Safety Knowledge – *National Approaches and Experience*

- Chapter 1: introduction
- Chapter 2: nuclear safety knowledge management
- Chapter 3: national level considerations
- Chapter 4: experience gained in Member States
- Appendices and Annexes: national examples and nuclear safety knowledge platforms

# INTRODUCTION

# Report Objective

The objective of the report is to **support Member States in implementing the IAEA Safety Standards in the area of managing nuclear safety knowledge at the national level**, i.e. beyond individual organizations' boundaries.

In line with:

- IAEA general safety requirements GSR Part 1 to GSR Part 7, and
- specific safety requirements for particular facilities and activities SSR-1 to SSR-6

# Report Scope :

- safety of nuclear installations,
  - radiation safety,
  - safety of radioactive waste management
  - safety in the transport of radioactive material
- nuclear safety knowledge management ultimate goal is to sustain and improve the **competence of individuals** and the **capacity of organizations** or **countries** to use knowledge effectively and responsibly **for safety.**

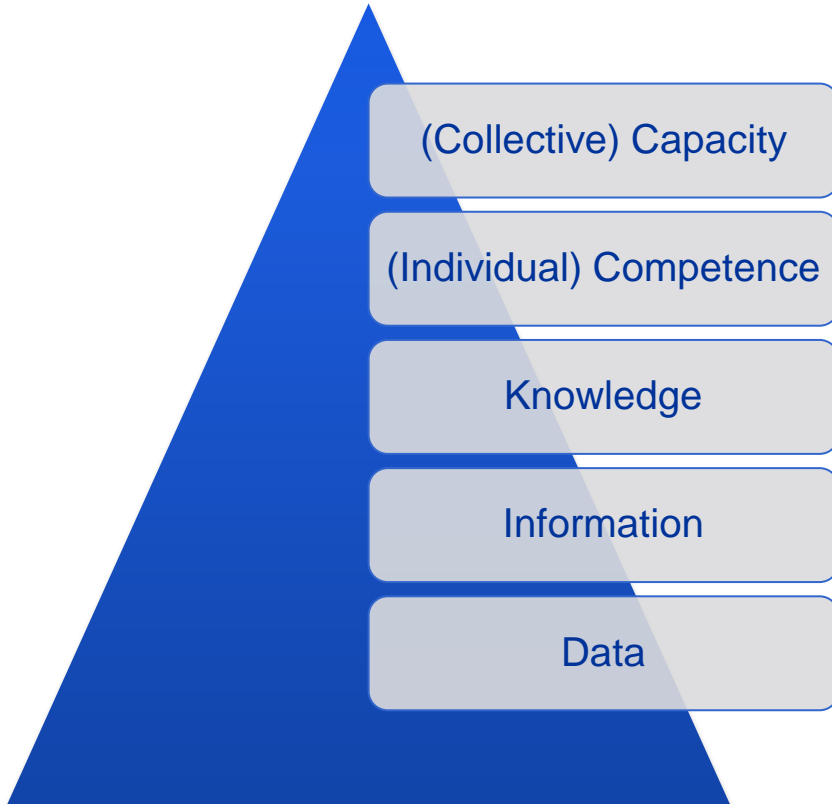
# The importance of KM

Knowledge Management (KM) has been identified as one of the key factors that can contribute to the safe and secure and efficient operation of nuclear activities and facilities in Member States

- Safety Standards (Part 1, Part 2, several levels)
- General Conference resolutions
- IAEA conferences (HR 2014, NKM 2004, 2007,, 2016)
- Nuclear Safety Action Plan (elements)
- IEM Reports

# NUCLEAR SAFETY KNOWLEDGE MANAGEMENT

## Knowledge Pyramid



## "Capacity for Action"

- Knowledge yields "capacity for action"
  - Owning information is not equal to being able to use it for action
  - "Information only becomes knowledge in the hands of someone who knows what to do with it." (Peter Drucker)

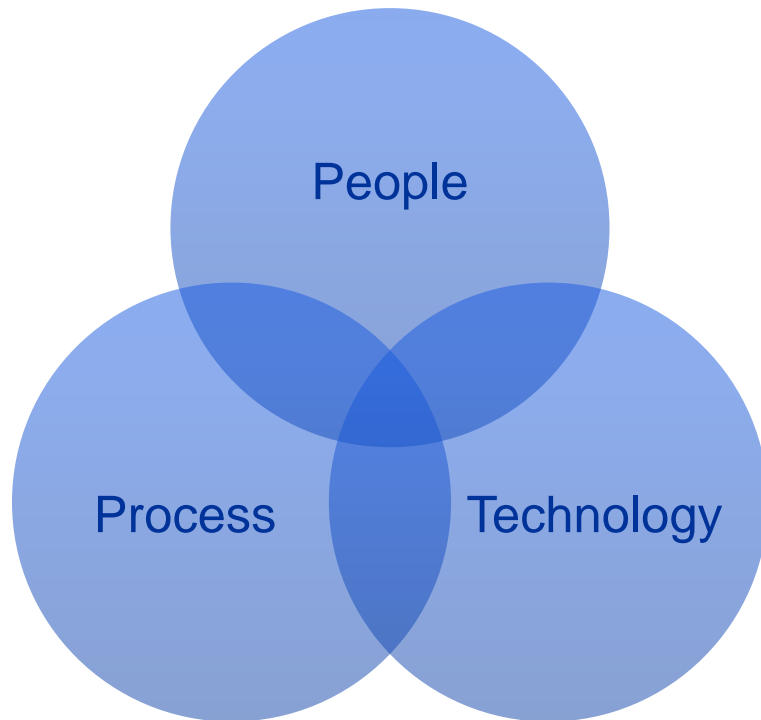


# Uses of KM

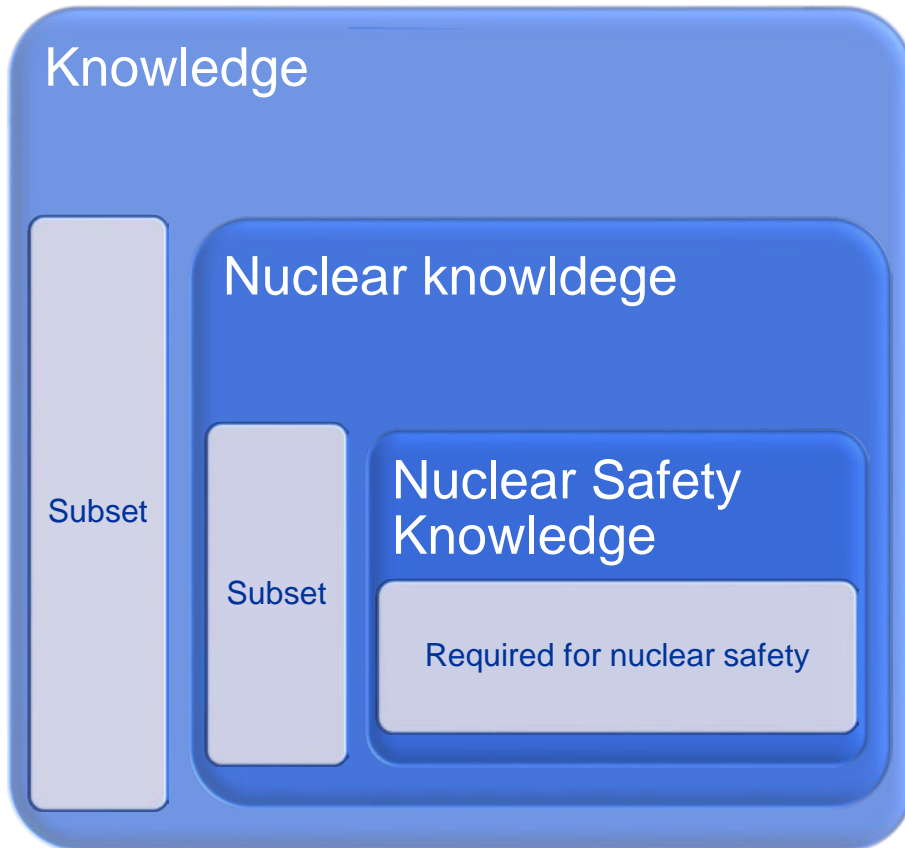


- Various uses and applications for KM exist
  - each with **existing and available sets of tools and techniques**
- KM is not equal to sharing everything and always

# KM Domains



- Knowledge management should always address:
  - People
  - Process
  - Technology
- All three are **relevant** for nuclear safety
- **NSKM must consider all three areas**



- Nuclear safety knowledge is
  - a **subset of nuclear knowledge**
  - that is **relevant to or required for nuclear safety**.

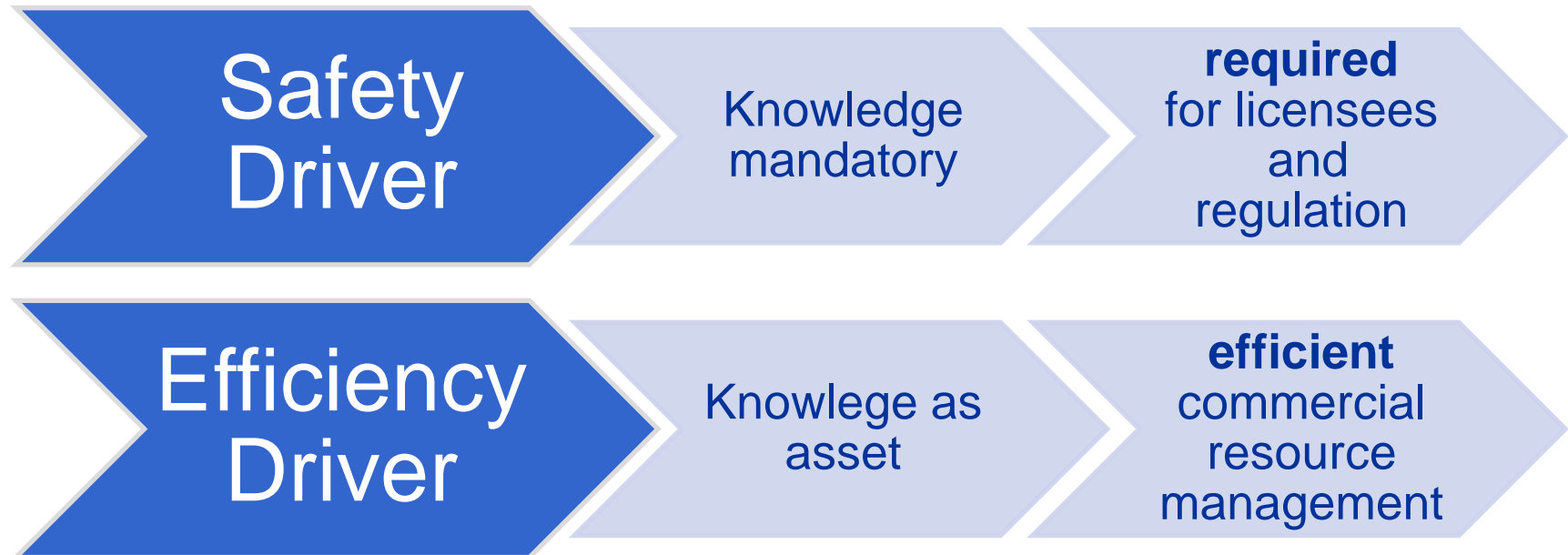
# Nuclear Safety Knowledge Management

**Nuclear Safety Knowledge Management (NSKM) is the management of knowledge relevant to or required for nuclear safety.**

- Nuclear Safety Knowledge Management entails **using knowledge management** approaches, tools and techniques **for the purpose of nuclear safety.**

# Two Driver Model

for using knowledge management in the nuclear sector



# Levels of NSKM

## Global

- Global safety experience, joint scientific heritage
- Globalization of nuclear sector, workforce migration

## National

- Role of governments, national development plans
- Interactions between regulator, TSO, operator and other stakeholders

## Organizational

- KM as part of integrated management system
- Responsibilities of regulator, TSO, operator

## Individual

- Attitudes, learning, awareness. Creativity.
- Career paths for each individual

# NSKM and Capacity Building



- “Umbrella approach” to CB:
  - education and training,
  - human resource development,
  - knowledge management, and
  - knowledge networks.
- **NSKM** as a pillar of **capacity building** for **nuclear safety**

# NSKM

FOCUS: NATIONAL LEVEL



# KM Benefits

FOR ALL NUCLEAR ORGANIZATIONS, FACILITIES OR ACTIVITIES

- Achieve **safe operation**
- Achieve **efficiency gains**
- Intergenerational **knowledge transfer**
- Facilitate **innovation** and **learning**
- Achieve **responsible use** by identifying and protecting sensitive knowledge
- Achieve **efficient and effective response** in a nuclear or radiological emergency

# NSKM: National Level





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# National level considerations

# NSKM: National Level

- Knowledge from **many sources**, in many **organizations, contexts and levels**
- Various **subjects** to be covered
- A wide group of **interested parties**

# NSKM: National Level

## CONSIDERATIONS

- The **role of governments**
- **Linking organizations** through knowledge interfaces
- Achieving **knowledge resilience** over longer timescales
- Considering new or restarting **nuclear programmes**
- Coping with **changes** in:
  - the **knowledge base**
  - **technology**
  - **society**

# NSKM: National Level

## CONSIDERATIONS (2)

- Transferring and preserving **knowledge**
- Developing a **national memory**
- National and cross-**organizational learning**
- Planning **human resources** at national level
- Involving all interested **parties**
- Linking to **regional and international** activities
- **Emergency** preparedness and response
- Considering **intellectual property**

# Coordinated National Approach

- A **coordinated national approach** for NSKM
  - national strategy
  - coordination mechanism
- **GSR Part1**: governments should establish a national policy and strategy for safety
  - leadership role of governments / regulatory bodies
- **NSKM strategy** to be included in national planning document
  - E.g. national nuclear development plan, a national capacity building plan
- NSKM will **vary** from country to country, depending on **national priorities and needs**.

# EXPERIENCE GAINED IN MEMBER STATES



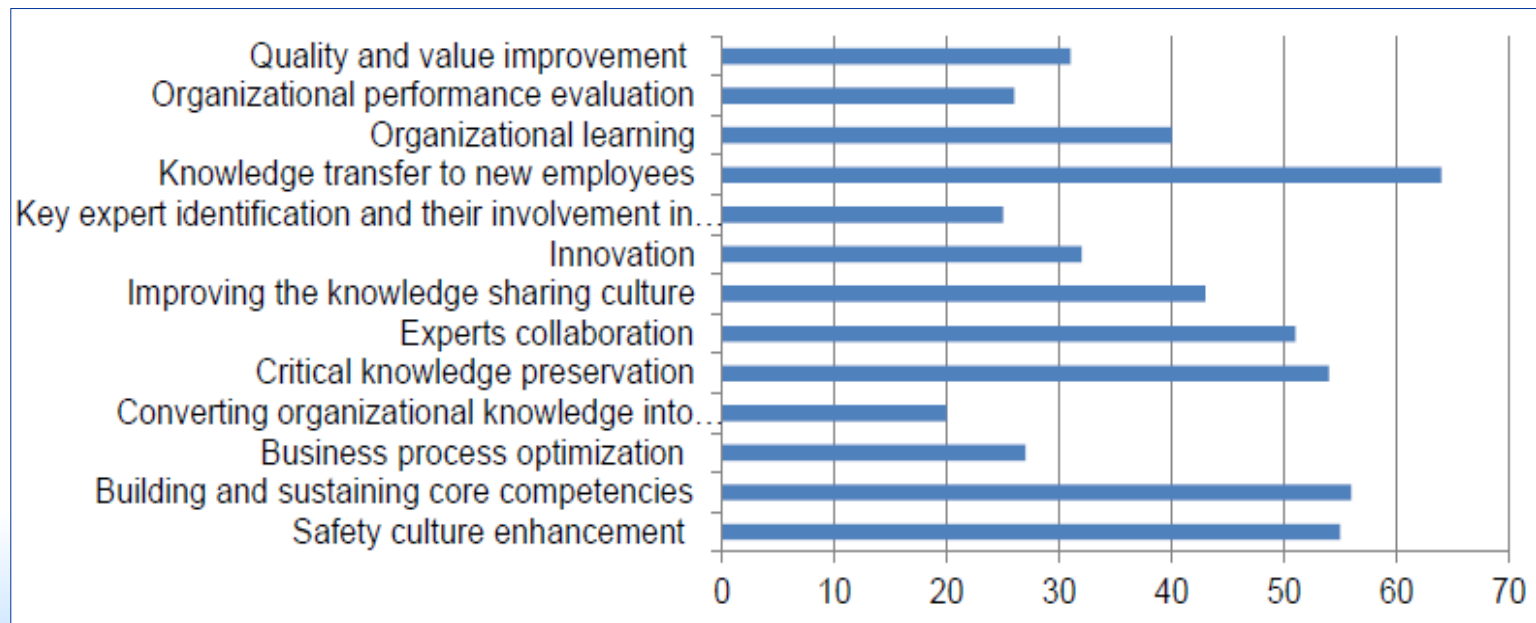
# Global Nuclear KM Review Survey

## The Survey:

- 120 participants
- 46 Member States
- 29 questions on the **application** and **benefits** of **knowledge management practices** in nuclear organizations

## RESULTS

Organisational goals are best supported by knowledge management:



# Coordinated National Approach

## (FEW) EXAMPLES

- **Russia:** ROSATOM – NEPIO
- **Germany:** Alliance for Competence in Nuclear Technology
- **South Africa:** National Centre of Excellence on Nuclear Safety and Security
- **Spain:** CEIDEN
- **United Arab Emirates:** new nuclear energy programme
- **Nigeria:** Atomic Energy Commission
- **Finland:** Committee for Nuclear Energy Competence

# Coordinated National Approach

- **Platforms and Interfaces**

- **GNSSN**
- **RASIMS**
- **EPRIMS**

- **Human Resources, Education and Training**

- **Germany:** Alliance for Competence in Nuclear Technology
- **Japan:** national nuclear HRD (N-HRD)-network
- **Cuba:** National Programming Framework
- **Greece:** national strategy for education and training in nuclear, radiation, transport and waste safety
- **Spain:** CEIDEN F+ working group study
- **U.K.:** National Skills Academy
- **European Commission** and the **Russian Federation** joint higher education programme

- **Knowledge Preservation**

- **Belgium:** the Thermal Reactor Safety Analysis data (STRESA)
- **U.K.:** changing the Focus of Knowledge Management for Nuclear Decommissioning
- **Spain:** RECOR Methodology

# Expectations

- Further comments from GNSSN SC
- Approval to go ahead with the document to be shared to all nominated participants of the TM
- Organization of a CS in June to further consolidate the report -> GNSSN SC members are welcome to attend
- GNSSN SC members need to nominate competent experts for the TM.



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*Thank you!*

